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## **(54) FIBER WEB HAVING HIGH WATER RETENTION AND PRODUCTION THEREOF**

(57)Abstract:

PURPOSE: To obtain the subject webs for food products and hygienic purposes because of their high safety, flexibility, excellent skin touch with reduced formation of web dust, by adding hygroscopic salts, polyhydric alcohols, saccharides and water retention sizing to the fiber suspension when web sheets are made.

CONSTITUTION: When a web sheet is made, (A) (i) hygroscopic salts such as sodium chloride, (ii) polyhydric alcohol such as glycerol, and/or saccharides such as reduced amylose, or (B) (i), (ii), and (iii) a water retention sizing such as sodium alginate are added after the fiber web is formed or in the wetted state before drying to give the objective web containing 1.0 to 300wt.% of component (A) or (B) based on the fiber

web.

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## CLAIMS

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### [Claim(s)]

[Claim 1] The fiber web which has the flood part content nature which contains the thickening agent of the salts of the salts which have hygroscopicity, polyhydric alcohol, and the saccharides which have a kind or hygroscopicity at least, polyhydric alcohol, and the saccharides which has a kind and water retention at least 1.0 to 300% of the weight to a fiber web, and is characterized by the bird clapper.

[Claim 2] The salts which have hygroscopicity, polyhydric alcohol and a saccharide, the fiber web that has the flood part content nature according to claim 1 characterized by the thickening agent which has water retention being food or a food additive.

[Claim 3] The manufacture method of a fiber web of having the flood part content nature according to claim 1 or 2 characterized by making the thickening agent which has the salts which have hygroscopicity, polyhydric alcohol and a saccharide, and water retention containing by the damp or wet condition after fiber web formation and before dryness in case a fiber web is milled.

[Claim 4] The manufacture method of a fiber web of having the flood part content nature according to claim 1 or 2 characterized by infiltrating the thickening agent which has the salts which have hygroscopicity in this web, polyhydric alcohol and a saccharide, and water retention after milling a fiber web.

## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Industrial Application] Safety of this invention is especially high about a fiber web and its manufacture methods, such as paper which has flood part content nature, and a nonwoven fabric, it is flexible, and it is related with the fiber web which is excellent in the touch and has a food grade and the object for sanitation with little web waste generating, and the suitable flood part content nature for a use for home use, and its manufacture method.

#### [0002]

[Description of the Prior Art] In home papers, such as a tissue paper and toilet paper, and other fiber webs, a softening agent is used from the former for the purposes, such as making a feel soft. This softening agent acts as a plasticizer of a humid paper reinforcing agent (medicine which maintains intensity when paper is damp), and also discovers the following operations.

[0003] It has a hydrophilic radical and a lipophilic group, a hydrophilic radical sticks to a cellulose, and a lipophilic group carries out orientation toward an outside. Therefore, a front face becomes smooth, while a cellulose will be in the state where it was wrapped in the lipophilic group and it becomes pliant. And slipping between celluloses becomes good, and resistance decreases, and a feel becomes smooth and becomes soft. And the hydrogen bond of fiber is blocked, and gap of fiber is promoted and is made soft.

[0004] the softening agent which makes such an operation mills paper, where the raw material of fiber webs, such as the above-mentioned tissue paper, is mixed -- having (this

being hereafter called inner \*\*) -- it is after formation of a web, and the damp or wet condition before dryness and the dried web which carried out paper making is infiltrated, and it is added (this is hereafter called outside \*\*)

[0005] As the above-mentioned softening agent, the surfactant, the wax emulsion (the wax was made to emulsify with a surfactant and a wax makes the role of the above-mentioned lipophilic group), and the reaction type softening agent (what it reacts [ what ] firmly with a cellulose and carries out orientation of the aliphatic hydrocarbon to the circumference of fiber regularly) are known conventionally. moreover, flannel soft on a recently and tissue paper, and silky -- while giving a feel [ like ], in order to also give high bulk nature, the softening agent of a silicon system is also developed (refer to JP,2-224626,A and a 3-900 official report)

[0006]

[Problem(s) to be Solved by the Invention] By the way, high safety is called for in order to contact food, a mucosa, the skin, etc. in the case of fiber webs, such as a food grade, an object for sanitation, and home use. However, the conventional softening agent mentioned above is a chemosynthesis article, and the addition in high concentration has concern in safety.

[0007] Moreover, as mentioned above, a hydrophilic radical sticks to a cellulose, a lipophilic group carries out orientation toward an outside, since it is in checking the hydrogen bond between fiber, a tangle and combination of fiber decrease, consequently fiber drops out, and, in paper powder, fiber powder, etc., so to speak, web waste increases the manifestation mechanism of an operation of the conventional flexibility. Furthermore, an outside is turned to, it is tintured with water repellence by the lipophilic group which is carrying out orientation, absorptivity falls, and the absorptivity originally required of a tissue paper, toilet paper, etc. is spoiled.

[0008] It originated in the above various problems, the addition was restricted in the conventional softening agent, and the flexibility which was more excellent in fiber webs, such as a tissue paper and toilet paper, was not able to be given.

[0009] Safety of this invention is high and it is flexible, when excelled also in the touch, there is moistness, and solves such a problem and aims at moreover offering a fiber web and its manufacture methods, such as paper which has a food grade and the object for sanitation with little web waste generating, and the suitable flood part content nature for a use for home use, and a nonwoven fabric.

[0010]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the fiber web of this invention contains the thickening agent of the salts of the salts which have hygroscopicity, polyhydric alcohol, and the saccharides which have a kind or hygroscopicity at least, polyhydric alcohol, and the saccharides which has a kind and water retention at least 1.0 to 300% of the weight to a fiber web, and is characterized by the bird clapper.

[0011] Moreover, it is characterized also by the thickening agent which has the salts which have the hygroscopicity of the above [ the fiber web of this invention ], polyhydric alcohol and a saccharide, and water retention being food or a food additive.

[0012] And after it makes the fiber web of this invention contain by the damp or wet condition before drying the thickening agent which has the salts which have hygroscopicity, polyhydric alcohol and a saccharide, and water retention in case a fiber

web is milled or it mills a fiber web, it is manufactured by the outside \*\* method characterized by infiltrating the thickening agent which has the salts which have hygroscopicity in this web, polyhydric alcohol and a saccharide, and water retention. [0013] As salts which have the hygroscopicity contained in the fiber web of this invention, a sodium chloride, a calcium chloride, a potassium pyrophosphate, sodium metaphosphate, a polyphosphoric acid potassium, sodium polyphosphate, etc. are mentioned.

[0014] Moreover, as the polyhydric alcohol which has hygroscopicity, and a saccharide, a glycerol, D sorbite, a maltitol, a reduction maltose starch syrup, a reduction amyloysis object, etc. are mentioned.

[0015] Furthermore, as a thickening agent which has water retention, a sodium alginate, sodium polyacrylate, a methyl cellulose, propylene glycol alginate, a carboxy methyl cellulose (CMC), a calcium carboxymethyl cellulose, sodium carboxymethyl starch, starch phosphoric ester sodium, casein, a casein sodium, etc. are mentioned.

[0016] the inside of the medicine which makes the operation which each thickening agent which has the salts which have the above-mentioned hygroscopicity, polyhydric alcohol and a saccharide, and water retention gives hygroscopicity, flexibility, touch nature, etc. to the fiber web of this invention, or makes it improve, and has hygroscopicity in the fiber web of this invention (therefore, these may be hereafter called collectively "grant agents, such as moisture absorption and flexibility,") -- what is necessary is just to contain a kind at least

[0017] if too not much few, the content effect will not arise, but since an effect is saturated and not much too many contents of grant agents, such as the above-mentioned moisture absorption, flexibility, etc. in the fiber web of this invention, become uneconomical even if there are conversely, in the fiber web of this invention, they receive the weight of this web and may be 1.0 - 300 % of the weight In addition, even if [ than 100 % of the weight ] more [ since there are too many moisture contents and they are inferior to a feeling of use when / than 100 % of the weight / more / the fiber web of this invention makes the touch of papers, such as a tissue paper, good, and / touch nature will not improve if fewer than 1 % of the weight, and / it is desirable to consider as 1.0 - 100 % of the weight, and / when making the touch of a nonwoven fabric good ], since it is not generated, such a problem is good In order to secure positive safety, as for grant agents, such as the above moisture absorption, flexibility, etc., it is desirable to use what was chosen from food or the food additive in this invention.

[0018] Moreover, in the fiber web of this invention, higher alcohol, such as lows, such as vegetable oil, such as hydrocarbons, such as a liquid paraffin and squalane, olive oil, camellia oil, castor oil, and soybean oil, yellow bees wax, a carnauba wax, and lanolin, and a cetanol, a stearyl alcohol, and oleyl alcohol, can be contained if needed because of [ other than grant agents, such as the above-mentioned moisture absorption, flexibility etc., ] improvement in a feeling of a smooth feeling and a feel. even if the content effect does not arise even if too not much few, but there are not much too many contents of this oil conversely, in order that a feeling of the touch may reduce them, what is considered as 0.1 - 30 % of the weight to the weight of this web in the fiber web of this invention is desirable

[0019] And in order to compensate the fall of the absorptivity which will be produced by content of the hydrophobic matter in order to make uniform the mixed state with a grant

agent or other compounding agents which are mentioned later, such as these oil, and the above-mentioned above-mentioned moisture absorption, flexibility, etc. Non-ion system surfactants, such as sucrose fatty acid ester, a sorbitan fatty acid ester, a glycerine fatty acid ester, the polyoxyethylene lanolin alcoholic ether, polyoxyethylene alkyl ether, and polyoxyethylene fatty acid ester, a fatty-acid salt, Optimum dose combination of the surfactants, such as anion system surfactants, such as alkylbenzene sulfonates and a polyoxyethylene-alkyl-ether sulfate, can be carried out if needed.

[0020] In addition, in the fiber web of this invention, antiseptics antifungal agents, such as a sorbic acid, a sorbic acid potassium salt, a dehydroacetic acid, a sodium dehydroacetate, a benzoic acid, a sodium benzoate, butyl parahydroxybenzoate, a PARAOKISHI benzoic-acid isobutyl, an ethyl parahydroxybenzoate, propylparaben, and a PARAOKISHI benzoic-acid isopropyl, and the above-mentioned conventional softening agent can also be used, carrying out optimum dose combination.

[0021] In order to manufacture the fiber web of the above this invention, after being after formation of a web, infiltrating grant agents, such as the above-mentioned moisture absorption, flexibility, etc., with a spray etc. by the damp or wet condition before dryness during paper milling of a fiber web, or milling a fiber web and drying, the outside \*\* method which sinks in grant agents, such as the above-mentioned moisture absorption, flexibility, etc., is adopted as this web.

[0022] What is necessary is to carry out the spray of the solution of grant agents, such as moisture absorption and flexibility, to a web (for example, on processing equipment), to immerse a web into this solution, or just to infiltrate requirements by printing to a web with a printing machine etc., after milling a fiber web, when carrying out after drying outside \*\*.

[0023]

[Function] In the fiber web of this invention, the thickening agent which has the salts which have hygroscopicity, polyhydric alcohol, a saccharide, or water retention makes the operation which makes content moisture increase. If the fiber web of this invention absorbs moisture by this operation, this moisture will make fiber swell, and will loosen the hydrogen bond of fiber, and will lessen resistance to external force. And this moisture acts also as lubricant between fiber and objects (for example, skin etc.). By operation of such moisture, flexibility and touch nature improve by the fiber web of this invention.

[0024] By the way, generally the humidity (moisture) of paper or a nonwoven fabric balances with the hygroscopicity force of paper or a nonwoven fabric, and the humidity of the open air. On the other hand, in the fiber web of this invention, when using together the thickening agent which has water retention with the salts which have hygroscopicity, polyhydric alcohol, and a saccharide, once the moisture in air is absorbed by the water retention of a thickening agent, the vapor rate will become slow by it. Therefore, in the fiber web of this invention which uses this thickening agent together, even if it is in the weather state where the humidity of the open air changes a lot, humidity becomes loose and an operation of moisture, such as the above-mentioned flexibility and improvement in the touch, continues.

[0025] And when using the above-mentioned thickening agent together, while the adhesive property of fiber improves by adhesion operation of this thickening agent, the bond strength of a web increases and generating of web waste decreases, tactile feeling (feeling of slime) also improves.

[0026]

[Example]

A basis weight The example which used paper as a fiber web : 1) By 13.0 g/m<sup>2</sup> To 1 set (two-sheet pile) of both sides of 200mm long and a 225mm wide tissue paper (it uses entering the tradename "white tissue" 200-set box made of Kono Paper) Grant agents (an independent solution or although it mixed solution), such as moisture absorption, the flexibility, etc. of this invention shown in Table 1, so that it may become the amount shown in Table 1 to 1 set (26.0 g/m<sup>2</sup> and this are made into 100 % of the weight) of this tissue paper After spraying uniformly and carrying out humidity by the hand spray, it was made to dry at 80\*\*2 degrees C by the full automatic constant temperature humidistat for 1 hour. Various kinds of measurement which shows in Table 4 was performed, and the sample after leaving this in a gas conditioning box (65\*\*5% of humidity) for 8 hours or more and being in equilibrium was collectively shown in Table 4 by making this result into examples 1-11.

[0027] The example which used the nonwoven fabric as a fiber web : 2) The amount of eyes judges the nonwoven fabric (the tradename made from Nimura Chemical industry "regent TCF#503" is used) of 30g/m<sup>2</sup> to 200mmx160mm. Grant agents (an independent solution or although it mixed solution), such as moisture absorption, the flexibility, etc. of this invention shown in Table 2 at both sides, so that it may become the amount shown in Table 2 to this nonwoven fabric (30.0 g/m<sup>2</sup> and this are made into 100 % of the weight) It dried like [ after spraying uniformly and carrying out humidity by the hand spray ] the example in the case of using the paper of the above 1, and about the sample after carrying out gas conditioning, various kinds of measurement shown in Table 5 was performed, and this result was collectively shown in Table 5 as examples 12 and 13.

[0028] 3) So that the paper or the nonwoven fabric same as a fiber web as the above 1 and 2 may be used and it may become the amount which shows the medicine shown in Table 3 instead of grant agents, such as moisture absorption, the flexibility, etc. of this invention, in Table 3 After spraying like the above 1 and 2, various kinds of measurement which dries like the above 1 and 2 and shows the sample which carried out gas conditioning in Tables 4 and 5 as the examples 1-2 (paper) of comparison, and 3-4 (nonwoven fabric) was performed, and this result was shown collectively.

[0029] Moreover, about the same paper or the same nonwoven fabric as the above 1 and 2 processed only with water except for the medicine shown in Table 1 - 3 for reference, various kinds of measurement shown in Tables 4 and 5 as blanks 1 (paper) and 2 (nonwoven fabric) was performed, and this result was shown collectively.

[0030]

[Table 1]

	実施例 No. (重量%)										
	1	2	3	4	5	6	7	8	9	10	11
塩化カルシウム	5.0	10.0				5.0					
ピロリン酸カリウム			10.0								
ソルビット				5.0	15.0	5.0		2.5	2.5	4.0	4.0
マルチトール							10.0				
グリセリン								1.5	1.5	4.0	4.0
流動パラフィン								1.0	1.0	4.0	4.0
アルギン酸ナトリウム									0.1	0.1	0.1
ポリオキシエチレン ラノリンアルコールエーテル								0.3	0.3		1.2
シヨ糖脂肪酸エステル										0.6	
ソルビタン脂肪酸エステル										0.3	
パラオキシ安息香酸エステル											0.05

[0031]

[Table 2]



	実施例No.(重量%)	
	12	13
塩化カルシウム		
ピロリン酸カリウム		
ソルビット	10.0	4.0
マルチトール		
グリセリン	10.0	4.0
流動パラフィン		4.0
アルギン酸ナトリウム		0.1
ポリオキシエチレン ラノリンアルコールエーテル		1.2
シヨ糖脂肪酸エステル		
ソルビタン脂肪酸エステル		
パラオキシ安息香酸エステル		0.05

[0032]

[Table 3]

	比較例No. (重)		
	1	2	3
流動パラフィン	10.0	10.0	10.0
ポリオキシエチレン ラノリンアルコールエーテル		3.0	
シヨ糖脂肪酸エステル	1.5		1.5
ソルビタン脂肪酸エステル	0.75		0.75

[0033] The following were used for each medicine of Table 1, Table 2, and Table 3.

Calcium chloride; Domestic chemistry A Make Tradename" calcium chloride "potassium pyrophosphate; Domestic chemistry (Reagent) A Make Tradename" potassium pyrophosphate "sorbitol; Nikken Chemicals (Reagent) Make Tradename "sorbitol-FP" -- maltitol; -- the tradename made from Tokyo Chemicals Industry "a maltitol (reagent)" -- glycerol; -- the tradename "a food additive glycerol" by Asahi Denka Kogyo K.K. -- liquid paraffin; -- the Esso Sekiyu tradename "the coulisse toll 70" -- sodium-alginate; -- The tradename "DAKKU algin NSPM" polyoxyethylene lanolin alcoholic ether; the tradename by Dai-Ichi Kogyo Seiyaku Co., Ltd. "lamination gene ephemeris-time-70" (HLB14) [ by KIBUN FOOD CHEMIFA CO., LTD. ]

Sucrose fatty acid ester; the tradename by Dai-Ichi Kogyo Seiyaku Co., Ltd. "DK ester F-140" (HLB13)

Sorbitan fatty acid ester; the tradename by Dai-Ichi Kogyo Seiyaku Co., Ltd.

"SORUGEN 50" (HLB4.7)

paraoxybenzoic acid; -- the tradename made from Ueno Pharmaceuticals -- "neo MEKKINSU [0034]"

[Table 4]

	吸湿量W(%)	手触り	引張り強度(
実施例 1	10.9	○	317
2	15.9	◎	215
3	11.8	○	241
4	8.5	△	327
5	10.1	◎	222
6	11.1	◎	231
7	8.1	△	243
8	8.5	○	209
9	8.9	◎	255
10	9.0	◎	191
11	9.2	◎	186
比較例 1	5.8	△	310
2	5.8	△	241
ブランク 1	5.6	×	312

[0035]

[Table 5]

	吸湿量W(%)	手触り	吸水度(sec)	保湿性,柔軟感
実施例 12	18.1	◎	1.3	○
13	14.0	◎	1.4	○
比較例 3	9.5	△	60<	×
4	8.3	△	2.2	△
ブランク 2	10.9	×	2.0	×

[0036] The W % of the amounts of moisture absorption in Table 4 and Table 5 is the numeric value which set the weight of the sample after 80 °C x 1-hour dryness to w1, set the weight of the sample after gas conditioning to w2, and was computed with the following formulas 1.

[0037]

[Equation 1]  $W = \{(w2 - w1) / w1\} \times 100$  [0038] Five panelists compare a feel in Table 4 and Table 5. a very good thing Moreover, three points, What is [ thing / good ] inferior one point in two points and a little good thing was made into zero point (however, it was presupposed that there may be a sample of this evaluation how many), five persons' mark were totaled, O and 4-7 points were made into \*\*, and 0-3 points were made / 12-15 points / into x for O and 8-11 points. That they wipe a hand using the sample of a nonwoven fabric as they usually wipe a hand in a handkerchief after the moistness of the skin in Table 5 and a flexible feeling wash a hand with the tap water and toilet soap of ordinary temperature furthermore, by repeating about each sample What is [ what / may compare moistness and a flexible feeling by five panelists ] inferior one point in two points and a little good thing was made into zero point (however, it was presupposed that there may be a sample of this evaluation how many), five persons' mark were totaled, O and 3-6 points were made into \*\*, and 0-2 points were made into x for 7-10 points.

[0039] Moreover, the tensile strength of Table 4 is JIS. It is the result of measuring the lengthwise intensity of paper according to a tensile-strength examination at the time of dryness of the tissue paper specified to S-3104, and the water absorbing capacity in Table 4 and Table 5 is JIS. It is the result of measuring according to the water-absorbing-capacity examination of the tissue paper specified to S-3104.

[0040] And the paper powder of Table 4 was measured using the equipment shown in drawing 1 . In drawing 1 , at namely, the pars basilaris ossis occipitalis of a box 1 (W400xL350xH300mm) which has opening 2 in the upper part Place the paper 3 which applied the W0100xL0100mm front face black, stick a double-sided tape on this front face without a crevice, and it enables it to adsorb paper powder. 5 sets of samples which gathered the edge by hand were inserted into the box 1 from opening 2, after shaking 30 times forward and backward within a box 1 as it is (have gathered the edge by hand), it took out, and viewing compared the coating weight of the paper powder to a paper 3 top.

O and a little many things were made into \*\*, and many things were made into x for what has few coating weight.

[0041] According to the example of the fiber web of this invention, the amount of moisture absorption, a feel, the tightness of paper powder generating, absorptivity, the moistness of the skin, and a flexible feeling are understood are very good compared with the blank thing which has not carried out the example of comparison and any processing which used the conventional softening agent so that clearly from Table 4 and Table 5.

[0042]

[Effect of the Invention] Since grant agents, such as safe moisture absorption, flexibility, etc., are used according to the fiber web of this invention as explained in full detail above, the content in high concentration is possible and it can have far excellent flexibility and touch nature compared with this conventional seed web. And the web which could secure still higher safety, for example, was extremely excellent as the humidity control material for freshness maintenance of food or sanitary goods can be offered by using food or a food additive as grant agents, such as this moisture absorption, flexibility, etc.

[0043] Moreover, since grant agents, such as moisture absorption, flexibility, etc. used by the fiber web of this invention, are tintured neither with lipophilic property nor water repellence, they can have the outstanding absorptivity.

[0044] In addition, if the thickening agent which has water retention as grant agents, such as moisture absorption and flexibility, is used together, the vapor rate of the absorbed moisture once becomes slow, and the operation which was excellent with moisture can be maintained for a long time. Therefore, according to the purpose of using the fiber web of this invention, a web with little influence by the humidity of the open air can be offered by using this thickening agent together. Moreover, the fiber web of this invention serves as tissue which is not dried by processing to a nonwoven fabric and which has admiration gently, and does not need the airtight container for dryness prevention like conventional wet tissue. Moreover, the moisturizing component in a web can transfer to the skin, can moisturize the skin, and can give more excellent touch nature and a flexible feeling.

[0045] Furthermore, according to the grant agents, such as moisture absorption, flexibility, etc. used by the fiber web of this invention, the bond strength of about [ not preventing with / of fiber / a debt ] and fiber can be raised, and generating of the so-called web waste can be lessened extremely.